

This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a Major, Municipal permit. The discharge results from the operation of a 24 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia WQS (effective January 6, 2011) and updating permit language as appropriate. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9VAC25-260 et seq.

1. Facility Name and Mailing Address: H.L. Mooney Advanced Water Reclamation Facility (AWRF)
PO Box 2266
Woodbridge, VA 22195
Facility Location: 1851 Rippon Blvd
Woodbridge, VA 22191
Facility Contact Name: Stephen Bennett
Facility E-mail Address: Bennett@pwcsa.com
SIC Code : 4952 WWTP
County: Prince William
Telephone Number: (703) 393-2062
2. Permit No.: VA0025101
Other VPDES Permits associated with this facility: VAN010018 – Nutrient General Permit
Other Permits associated with this facility: Air Registration No 71751
E2/E3/E4 Status: Not Applicable
Expiration Date of previous permit: June 30, 2014
3. Owner Name: Prince William County Service Authority
Owner Contact/Title: Stephen Bennett
Deputy Director, Water Reclamation
Owner E-mail Address: Bennett@pwcsa.com
Telephone Number: (703) 393-2062
4. Application Complete Date: December 13, 2013
Permit Drafted By: Alison Thompson
Draft Permit Reviewed By: Doug Frasier
Public Comment Period : Start Date: End Date:
Date Drafted: July 2, 2014
Date Reviewed: July 9, 2014
5. Receiving Waters Information:
Receiving Stream Name : Neabsco Creek
Drainage Area at Outfall: Not Applicable
Stream Basin: Potomac
Section: 6
Special Standards: b, y
7Q10 Low Flow: Tidal (Apr-Oct)
1Q10 Low Flow: Tidal (Apr-Oct)
30Q10 Low Flow: Tidal (Apr-Oct)
Harmonic Mean Flow: Tidal
Stream Code: 1aNEA
River Mile: 1.57
Subbasin: Potomac
Stream Class: II
Waterbody ID: VAN-A25E
7Q10 High Flow: Tidal (Nov-Mar)
1Q10 High Flow: Tidal (Nov-Mar)
30Q10 High Flow: Tidal (Nov-Mar)
30Q5 Flow: Tidal

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

☒ State Water Control Law☒ Clean Water Act☒ VPDES Permit Regulation☒ EPA NPDES Regulation☒ EPA Guidelines☒ Water Quality Standards☒ Other (9VAC25-415; 9VAC25-40)

7. Licensed Operator Requirements: Class I

8. Reliability Class: Class I

9. Permit Characterization:

☐ Private☐ Federal☐ State☒ POTW☒ TMDL☐ Effluent Limited☒ Water Quality Limited☒ Whole Effluent Toxicity Program Required☒ Pretreatment Program Required☒ e-DMR Participant☐ Possible Interstate Effect☐ Compliance Schedule Required☐ Interim Limits in Permit☐ Interim Limits in Other Document

10. Wastewater Sources and Treatment Description:

This facility is a publicly owned treatment works with a design flow of 24 MGD. The Certificate to Operate the 24 MGD facility was issued on November 8, 2010. The upgrade to the 24 MGD tier with state-of-the-art nutrient removal was completed as a cost share with DEQ Grant #440-S-08-15.

Treatment consists of screening, grit removal with coagulant feed (ferric chloride), flow equalization, primary clarification, aeration basins, secondary clarification, denitrification filters, UV disinfection, and cascade post aeration before discharge to the tidal portion of Neabsco Creek at Outfall 001. See Attachment 1 for a facility schematic/diagram.

Five storm water outfalls for the HL Mooney AWRP were permitted under VPDES General Stormwater Industrial Permit VAR051424. A site review was conducted by DEQ staff on February 28, 2014 and by letter dated April 11, 2014 (Attachment 2) DEQ approved the no-exposure certification to the facility and the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity was terminated on May 11, 2014.

TABLE 1 – Outfall Descriptions

Outfall Number	Discharge Sources	Treatment	Design Flow(s)	Outfall Latitude and Longitude
001	Domestic and/or Commercial Wastewater	See Item 10 above.	24 MGD	38° 36' 39" 77° 16' 13"
Stormwater Outfalls 001-007	Non-contaminated stormwater	None	Not Applicable	Various
See Attachment 3 for (DEQ #194D – Quantico) topographic map.				

11. Sludge Treatment and Disposal Methods:

Bar screenings and grit are hauled by truck to an approved landfill. Currently, the facility incinerates the majority of their sewage sludge. Gravity thickened sludge is pumped to sludge holding tanks prior to dewatering. The sludge is chemically conditioned with polymer before dewatering by high solids centrifuges. Dewatered sludge is incinerated in a Fluidized Bed Incinerator (FBI).

The inert ash is mixed with sawdust and hauled by truck to the landfill. When the incinerator is out of service for maintenance, sludge is has been hauled to multiple landfills for disposal.

According to the application, the facility incinerates 5,488 dry metric tons of sewage sludge annually. The application identified four landfills that received sewage sludge (234.08 dry metric tons) from this facility: Atlantic Waste Disposal-Sussex County, Waste Management of Virginia Inc – Charles City County, King George Landfill and Recycling Center, and Middle Peninsula Landfill and Recycling Facility.

With this reissuance, the facility has requested that permit conditions and limitations be included for the land application of lime-stabilized sludge as well as conditions allowing the sludge to be composted. The regulations that establish the permit limitations and conditions specific to the land application of the sewage sludge are discussed in Fact Sheet Section 20.d.

12. Discharges, Intakes, Monitoring Stations, Other Items in Vicinity of Discharge

TABLE 2	
VA0024678	Dale Service Corporation Section 8 Outfall 001. River mile 9.15 on Neabsco Creek.
VA0024724	Dale Service Corporation Section 1 Outfall 001. River mile 0.04 on UT to Neabsco Creek.
1aNEA002.89	DEQ Ambient Water Quality Monitoring Station at Route 1. River mile 2.89 on Neabsco Creek.
VA0025101	PWCSA HL Mooney WRF Outfall 001. River mile 1.57 on Neabsco Creek.
1aNEA000.40	DEQ Ambient Water Quality Monitoring Station in Neabsco Bay. River near marker 3/4.
1aNEA000.57	DEQ Ambient Water Quality Monitoring Station midway into Neabsco Bay near the railroad Bridge.
There are no known drinking water intakes in the vicinity of the outfall.	

13. Material Storage:

TABLE 3 - Material Storage	
Materials Description	Maximum Volume Stored
Ferric Chloride	48,000 gallons (4 – 12,000 gallon tanks)
Pebble Lime	180 tons (1 – silo)
Sodium Hydroxide	6,000 gallons (1 – 6,000 gallon tank)
Methanol	25,000 gallons (1 – 25,000 gallon tank)
Sodium Hypochlorite	24,000 gallons (2 – 12,000 gallon tanks)
Diesel Fuel	500 gallons (1 tank)
Unleaded Gasoline	2,000 gallons (1 tank)
Kerosene	275 gallons (1 tank)
Lubricants	Numerous 55-gallon drums
Low Sulfur Diesel Fuel	14,220 gallons (2 – 7,000 gallon tanks and 1-220 gallon tank)

14. Site Inspection:

Performed by DEQ-Compliance on September 21, 2012 (Attachment 4).

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15. Receiving Stream Water Quality and Water Quality Standards:**a. Ambient Water Quality Data**

This facility discharges into a segment of tidal Neabsco Creek that is not currently monitored by DEQ, but is listed with a water quality impairment. The following is the water quality summary for the receiving stream segment of tidal Neabsco Creek, as taken from the 2012 Integrated Report:

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. A PCB TMDL for the tidal Potomac River watershed has been completed and approved.

The aquatic life use is fully supporting. A TMDL has been completed for the Chesapeake Bay watershed. This downstream TMDL completed by EPA addresses the poor water quality in the Chesapeake Bay, and takes into account the entire Bay watershed including upstream tidal tributaries such as Neabsco Creek. The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed.

The recreation and wildlife uses were not assessed.

There is a downstream DEQ ambient monitoring station, 1aNEA000.57, located in Neabsco Bay at the railroad bridge, approximately 1 mile downstream of Outfall 001. The following is the water quality summary for Neabsco Bay, as taken from the 2012 Integrated Report:

DEQ monitoring stations located in Neabsco Bay:

- *Ambient water quality monitoring station 1aNEA000.40, near Marker 3/4*
- *Fish tissue, water quality, and continuous monitoring station 1aNEA000.57, at railroad bridge*

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and sufficient excursions above the fish tissue value (TV) for PCBs in fish tissue. Additionally, an excursion above the fish tissue value (TV) of 300 parts per billion (ppb) for mercury (Hg) in fish tissue was recorded in one species of fish (1 total samples) collected in 2008 at monitoring station 1aNEA000.57 (bluegill sunfish) is noted by an observed effect. A PCB TMDL for the tidal Potomac River watershed has been completed and approved.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use.

The aquatic life use is fully supporting. A TMDL has been completed for the Chesapeake Bay watershed. This downstream TMDL completed by EPA addresses the poor water quality in the Chesapeake Bay, and takes into account the entire Bay watershed including upstream tidal tributaries such as Neabsco Creek. The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed.

The wildlife use is considered fully supporting.

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b. 303(d) Listed Stream Segments and Total Maximum Daily Loads (TMDLs)**TABLE 4- 303(d) Impairment and TMDL information for the receiving stream segment**

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
<i>Impairment Information in the 2012 Integrated Report</i>						
Neabsco Creek	Fish Consumption	PCBs	Tidal Potomac River PCB 10/31/2007	2.12 grams/year PCB	0.064 ng/L PCB --- 24 MGD	NA

TABLE 5 - Information on Downstream 303(d) Impairments and TMDLs

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
<i>Impairment Information in the 2012 Integrated Report</i>							
Neabsco Bay	Recreation	<i>E. coli</i>	0.25 miles	No	---	---	2016
Chesapeake Bay	Aquatic Life	Total Nitrogen	---	Chesapeake Bay TMDL 12/29/2010	219,280 lbs/yr TN	Edge of Stream (EOS) Loads	NA
		Total Phosphorus			13,157 lbs/yr TP		
		Total Suspended Solids			2,192,803.2 lbs/yr TSS		

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2012 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment. EPA issued the Bay TMDL on December 29, 2010. It was based, in part, on the Watershed Implementation Plans developed by the Bay watershed states and the District of Columbia.

The Chesapeake Bay TMDL addresses all segments of the Bay and its tidal tributaries that are on the impaired waters list. As with all TMDLs, a maximum aggregate watershed pollutant loading necessary to achieve the Chesapeake Bay's water quality standards has been identified. This aggregate watershed loading is divided among the Bay states and their major tributary basins, as well as by major source categories [wastewater, urban storm water, onsite/septic agriculture, air deposition]. Fact Sheet Section 17.e provides additional information on specific nutrient limitations for this facility to implement the provisions of the Chesapeake Bay TMDL.

The planning statement is found in Attachment 5.

c. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream Neabsco Creek is located within Section 6 of the Potomac River Basin, and classified as a Class II water.

Class II tidal waters in the Chesapeake Bay and its tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185 and maintain a pH of 6.0-9.0 standard units as specified in 9VAC25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen concentrations are presented Attachment 6.

The Freshwater Water Quality/Wasteload Allocation Analysis (Attachment 7) details other water quality criteria applicable to the receiving stream. Since there is tidal influence at the outfall, dilution ratios will be used in lieu of the steady state complete mix equation (Attachment 8, page 9).

Some Water Quality Criteria are dependent on the temperature and pH and Total Hardness of the stream and final effluent. The stream and final effluent values used as part of Attachment 7 are as follows:

pH and Temperature for Ammonia Criteria:

The fresh water, aquatic life Water Quality Criteria for Ammonia are dependent on the instream temperature and pH. Since the effluent may have an impact on the instream values, the temperature and pH values of the effluent must also be considered when determining the ammonia criteria for the receiving stream. The 90th percentile temperature and pH values are used because they best represent the critical conditions of the receiving stream.

For the 2003-2008 permit cycle, the pH and temperature data from DEQ's ambient monitoring station 1ANEA000.57 was evaluated and consequently used to develop the ammonia criteria and subsequent permit limits. Staff believed that the data contained a sampling bias since most ambient samples were collected between 10 a.m. and 2 p.m., the time period of the highest photosynthetic activity in a shallow, open embayment such as the mouth Neabsco Creek. Because of the potential sampling bias, staff used the 50th percentile pH and temperature values for the calculation of the ammonia as nitrogen criteria and the subsequent limits. Through a permit special condition in the 2003 permit, the permittee conducted pH and temperature monitoring in Neabsco Creek to determine if there was sampling bias and if the pH assumptions were correct.

The permittee submitted a final instream monitoring report in December 2005. A copy of the report was submitted with the application and is also found in Attachment 8. The study provided a better snapshot of the pH conditions in Neabsco Creek during each of the seasons than the limited data pool available during the 2003 reissuance. The 90th percentile pH and temperature from the 2005 study were used for the November-January and February-March ammonia criteria with the 2009-2014 reissuance. The values used for each of the seasonal ammonia criteria are summarized in Table 6a:

TABLE 6a – Acute and Chronic Ammonia Criteria				
Season	90 th percentile pH (S.U.)	90 th percentile temperature (°C)	Acute Ammonia as N (mg/L)	Chronic Ammonia as N (mg/L)
November 1 – February 14 *	8.0 (7.6)**	11.6 (6.7)	8.4 (17.0)	2.9 (6.4)
February 15 – March 31	8.42 (7.8)	10.4 (8.1)	3.7 (12.1)	1.2 (3.2)

* Early Life Stages Absent - Special Standard y

** Values in parentheses are the 50th values and criteria used in the 2003 reissuance

For the April to October ammonia criteria, the permittee proposed to derive a 30-day average criteria using paired pH and temperature data from the 2005 study. DEQ also had a robust data set for the embayment from 2006 for the April to October time period, so the permittee derived 30-day average ammonia criteria using both paired data sets. DEQ accepted this approach and the documentation for the derivation of the criteria used for the current April-October weekly average is found in Attachment 9. Presented in the table below are the 90th percentile pH and temperature derivations when you look at the pH and temperature separately rather than as paired data. These numbers are for illustrative purposes only.

TABLE 6b – Acute and Chronic Ammonia Criteria				
Season	90 th percentile pH (S.U.)	90 th percentile temperature (°C)	Acute Ammonia as N (mg/L)	Chronic Ammonia as N (mg/L)
April 1–October 31 (PES months)	8.9 (8.2)**	30.11 (24.2)	3.7 (5.72)	0.69 (0.96)

** Values in parentheses are the 50th values and criteria used in the 2003 reissuance

Since the pH and temperature values used to establish the ammonia criteria is data from Neabsco Creek downstream of the discharge, staff reviewed the DEQ ambient field data for monitoring station 1aNEA000.57 to determine if the data used to establish the criteria is still appropriate. Staff reviewed available data from January 2010 through March 2014. A copy of the data is found in Attachment 7.

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TABLE 6c – pH and Temperature Comparison				
Season	90 th percentile pH (S.U.) used to establish criteria	90 th percentile pH (S.U.) DEQ monitoring data	90 th percentile temperature (°C) used to establish criteria	90 th percentile temperature (°C) DEQ monitoring data
November 1 – February 14 *	8.0	7.95	11.6	9.7
February 15 – March 31	8.42	8.248	10.4	9.9
April 1–October 31 (PES months)	8.9	8.54	30.11	28.0

* Early Life Stages Absent - Special Standard y

Based on the above comparison in Table 6c, it is staff's best professional judgment that the values used to establish the criteria are still appropriate and shall be used to establish the criteria and subsequent wasteload allocations for this reissuance.

Total Hardness for Hardness-Dependent Metals Criteria:

The Water Quality Criteria for some metals are dependent on the receiving stream's total hardness (expressed as mg/L calcium carbonate) as well as the total hardness of the final effluent.

The average total hardness for the VAN-A25E watershed (Neabsco Creek, Occoquan River) is 105.9 mg/L. This value was derived utilizing all the available DEQ ambient data in the watershed from January 1990 through February 2011.

The effluent data for total hardness was provided as part of the application. There were three data points: 126 mg/L on July 11, 2012, 113 mg/L on December 13, 2011, and 125 mg/L on December 5, 2012. The average total hardness for this facility is 121 mg/L.

The hardness-dependent metals criteria in Attachment 7 are based on these three recent values.

Bacteria Criteria:

The Virginia Water Quality Standards at 9VAC25-260-170A state that the following criteria shall apply to protect primary recreational uses in surface waters:

E. coli bacteria per 100 ml of water shall not exceed a monthly geometric mean of the following:

	Geometric Mean ¹
Freshwater <i>E. coli</i> (N/100 ml)	126

¹For a minimum of four weekly samples [taken during any calendar month].

d. Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Neabsco Creek, is located within Section 6 of the Potomac Basin. This section has been designated with special standards of b and y.

Special Standard "b" (Potomac Embayment Standards) established effluent standards for all sewage plants discharging into Potomac River embayments and for expansions of existing plants discharging into non-tidal tributaries of these embayments. 9VAC25-415, Policy for the Potomac Embayments controls point source discharges of conventional pollutants into the Virginia embayment waters of the Potomac River, and their tributaries, from the fall line at Chain Bridge in Arlington County to the Route 301 Bridge in King George County. The regulation sets effluent limits for BOD₅, total suspended solids, phosphorus, and ammonia, to protect the water quality of these high profile waterbodies.

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Special Standard “y” is the chronic ammonia criterion for tidal freshwater Potomac River and tributaries that enter the tidal freshwater Potomac River from Cockpit Point (below Occoquan Bay) to the fall line at Chain Bridge. During November 1 through February 14 of each year the thirty-day average concentration of total ammonia nitrogen (in mg N/L) shall not exceed, more than once every three years on the average the following chronic ammonia criterion:

$$\left(\frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right) \times 1.45(10^{0.028(25 - \text{MAX})})$$

MAX = temperature in °C or 7, whichever is greater.

The default design flow for calculating steady state waste load allocations for this chronic ammonia criterion is the 30Q10, unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of this water quality criterion.

e. Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on January 8, 2014 for records to determine if there are threatened or endangered species in the vicinity of the discharge. No threatened or endangered species were identified within a 2 mile radius of the discharge. The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and protect the threatened and endangered species found near the discharge. The printout from the database can be found in Attachment 10.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed limits are protective of this use.

f. Maryland Water Quality Standards

HL Mooney Water Reclamation Facility discharges to Neabsco Creek, which is a tributary to the Potomac River. The discharge is approximately 0.5 miles from the Maryland State line. Staff reviewed the State of Maryland's Water Quality Standards and believes that the effluent limitations established in this permit will comply with Maryland's water quality standards at the point Neabsco Creek enters the Potomac River.

16. **Antidegradation (9VAC25-260-30):**

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream has been classified as Tier 1 based on the following: the receiving waters have been designated as impaired, and the effluent limits are set to meet the water quality standards. Permit limits proposed have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. **Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:**

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLA) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are then calculated on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a. Effluent Screening:

Effluent data obtained from the permit application and Discharge Monitoring Reports (DMRs) from January 2013 through March 2014 has been reviewed and determined to be suitable for evaluation.

The following pollutants require a wasteload allocation analysis based on data provided as part of the permit application: Copper, Molybdenum, Nickel, Mercury, Zinc, and Vanadium. With regard to the Outfall 001 discharge, ammonia as N is also likely present since this is a wastewater treatment facility treating sewage.

b. Mixing Zones and Wasteload Allocations (WLAs):

Neabsco Creek at the point of discharge is a tidal estuary and has tidal influence. For tidal estuaries, chronic wasteload allocations should be based on site specific data of waste dispersion or dilution. Where dispersion/dilution data is not available, a dilution ratio of 50:1 for chronic toxicity is usually recommended as default. Acute wasteload allocations are established by multiplying the acute water quality criteria by 2. The 2X factor is derived from the fact that the acute criteria are defined as one half of the final acute value (FAV) for a specific toxic pollutant. The term "final acute value" is defined as a cumulative probability of 0.05 for the acute toxicity values for all genera for which acceptable acute tests have been conducted with toxicants (Guidance Memo 00-2011).

Staff believes that the guidance for chronic dilution of 50:1 for tidal waters is not applicable to this waterbody because the discharge is located near the fall line where the tidal influence is the smallest, the embayment is very shallow, and has an abundance of macrophytes. Staff's position is that unless dilution is demonstrated through a site-specific study, no dilution is recognized and chronic water quality criteria will be applied at end-of-pipe. PWCSA did conduct a site specific dilution study and near field-mixing analysis in 1997 for Neabsco Creek (Attachment 11). The documentation provided are used as the basis for the chronic toxicity instream waste concentrations summarized below:

Season	24 MGD	
	IWC	Dilution Factor
November–March	40.53%	2.47:1
April–October (except ammonia)	41.84%	2.39:1

The above values are used to derive WLAs for all chronic criteria except ammonia. Because ammonia decays, the recent PWCSA pH and temperature study in Attachment 12 addressed the decay of ammonia and determined IWCs just for chronic ammonia criteria. In the 2003 reissuance decay was not considered because the 50th percentile temperatures were less than 10°C. Staff's opinion was that nitrification in ambient waters is negligible when temperature is < 10°C.

The instream monitoring found that the winter temperatures were higher than the 50th percentile values used during the 2003 reissuance, so staff allowed decay for the November to March period. The following dilution factors for ammonia are used for limit development with this reissuance:

Season	24 MGD	
	IWC	Dilution Factor
November - January	26.63%	3.76:1
February -March	27.67%	3.61:1
April–October	20.18%	4.96:1

c. Effluent Limitations Toxic Pollutants, Outfall 001 –

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N:Ammonia as N (April through October)

The following table summarizes the ammonia limits evaluated during this reissuance:

Source of the Monthly Average Limit	Monthly Average Limit – 24 MGD
Policy for the Potomac River Embayments (PPRE)	1.0 mg/L
Water Quality Criteria	3.42 mg/L

Since the PPRE is more stringent than the current Water Quality Criteria, the April through October monthly average limit shall be 1.0 mg/L. The weekly average limit will be 4.1 mg/L at 24 MGD, and it is based on the WQC established with the 30-day average criteria using paired pH and temperature data, the mixing zone study, and wasteload allocation described in 15.c. and 17.b.

Ammonia as N (November 1st through January 31st)

Attachment 7 contains the derivation of the Early Life Stages Absent ammonia criteria. Special Standard y lists the Early Life Stages Absent from November 1st through February 14th. Since it is not practical to have limits for half a calendar month, staff has set the limits for November through January. This is a conservative choice to assure protection against chronic toxicity for any consecutive 30-day period during February through March. The limits for November 1st through January 31st are:

Ammonia as N November-January	24 MGD
Monthly Average	No Limit
Weekly Average	No Limit

Ammonia as N (February through March)

There are slight differences in the calculation of the ammonia limits for the February 1st through March 31st time frame between the 2009 and 2014 reissuances. The limits calculated are:

Ammonia as N February-March	2009 reissuance	2014 reissuance
Monthly Average	4.3 mg/L	4.5 mg/L
Weekly Average	5.2 mg/L	5.4 mg/L

The difference is due to the presentation of the most limiting WLAs in the Freshwater Water Quality/Wasteload Allocation Analysis Spreadsheet (Attachment 7). In 2009, the most limiting WLAs were presented with one decimal place; the current version of the spreadsheet (updated by DEQ's Central Office in February 2012) presents the most limiting WLAs with two decimal places. When these new values are calculated by the dilution factors for ammonia, slight differences are seen in the resulting values.

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Although the new evaluation would allow relaxed Ammonia as N monthly average and weekly average limitations, the current Ammonia as N monthly average and weekly average limitations shall be carried forward for the following reasons:

- 1) Antibacksliding regulations prohibit relaxed effluent limitations unless specific criteria are met;
- 2) The facility was designed to meet the current limits and has been complying with the current limitations; and
- 3) The Environmental Protection Agency (EPA) finalized new, more stringent ammonia criteria in August 2013; possibly resulting in significant reductions in ammonia effluent in NPDES Discharge Permits. It is staff's best professional judgment that incorporation of these criteria into the Virginia Water Quality Standards is forthcoming. This and many other facilities may be required to comply with these new criteria during their next respective permit terms, so any increase in the Ammonia as N effluent limitations would be counterproductive to the new EPA ammonia criteria.

All of the limit derivations for Ammonia as N can be found in Attachment 14.

2) Metals:

Copper, Mercury, Nickel, Molybdenum, Vanadium, and Zinc all had detectable concentrations in at least one of the three scans done as part of the reissuance application package. None of the values were close to the Site Specific Target Values calculated for the facility, so no limit evaluations are needed since there is no reasonable potential to exceed the WQS.

d. Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), *E. coli*, and pH limitations are proposed.

Dissolved oxygen (D.O.) has a daily minimum concentration of 6.0 mg/L and is based on original modeling conducted (Attachment 13) and is set to meet the water quality criteria for D.O. in the receiving stream.

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

e. Effluent Limitations Policy for the Potomac River Embayments (PPRE), Outfall 001

The PPRE included monthly average effluent limits that apply to all sewage treatment plants:

<u>Parameter</u>	<u>Monthly Average (mg/L)</u>
cBOD ₅	5
Total Suspended Solids	6.0
Total Phosphorus	0.18
NH ₃ (Apr 1 – Oct 31)	1.0

The PPRE states that the “above limitations shall not replace or exclude the discharge from meeting the requirements of the State’s Water Quality Standards (9VAC25-260-10 *et seq.*)” These limits are protective of the criteria for dissolved oxygen.

f. Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. Only concentration limits are now found in the individual VPDES permit when the facility installs nutrient removal technology. The basis for the concentration limits is 9VAC25-40 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* which requires new or expanding discharges with design flows of ≥ 0.04 MGD to treat for TN and TP to either BNR (Biological Nutrient Removal) levels (TN = 8 mg/L; TP = 1.0 mg/L) or SOA (State of the Art) levels (TN =

3.0 mg/L and TP = 0.3 mg/L).

This facility has also obtained coverage under 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN010018. Total Nitrogen Annual Loads and Total Phosphorus Annual Loads from this facility are found in 9VAC25-720 – *Water Quality Management Plan Regulation* which sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e., those with design flows of ≥ 0.5 MGD above the fall line and > 0.1 MGD below the fall line.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, and Total Nitrogen are included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9VAC25-820. This facility was first upgraded to Biological Nutrient Removal (BNR) technology with WQIF grant #440-S-98-03. This facility used Water Quality Improvement Funds to upgrade the facility to SOA treatment at 24 MGD. As such, an annual average effluent limitation of 3.0 mg/L for Total Nitrogen and monthly and Year-To-Date calculations are included in this individual permit at the 24 MGD flow tier. The facility's annual Total Nitrogen allocation set forth in 9VAC25-720 – *Water Quality Management Plan Regulation* is also based on 3.0 mg/L at 24 MGD.

The annual average limitation for Total Phosphorus (TP) was not included in this individual permit. The monthly average TP limit of 0.18 mg/L is based upon the Policy for the Potomac River Embayments, which the general permit does not supersede. It is staff's best professional judgment that this monthly average limit is more stringent than the annual average at the same concentration per the WLA found in 9VAC25-720-120-C.

f. Effluent Limitations and Monitoring Summary:

The effluent limitations are presented in the following table. Limits were established for cBOD₅, Total Suspended Solids, Ammonia as Nitrogen, pH, Dissolved Oxygen, Total Phosphorus, Total Nitrogen, and *E. coli*. Monitoring is included for Flow, TKN, Nitrate+Nitrite, and Whole Effluent Toxicity.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 3.785.

The mass loading (lb/d) for Total Phosphorus monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 8.345.

An ammonia loading limit for the summer months is included in the permit because the basis for this limit is PPRE and not the toxic water quality criteria.

The weekly average concentrations for TSS, Total Phosphorus, and cBOD₅ were calculated by using the monthly average concentration and multiplying by a 1.5 multiplier.

While the facility received the Certificate to Operate for the 24 MGD tier in November 2010, the monthly average flow at the facility has been approximately 13 MGD from August 2012 through August 2013. Since the flows are still well under the design flow, DEQ granted the reduced monitoring frequencies cBOD, TSS, and *E. coli* at the 24 MGD flow tier until the monthly average flow reaches 16 MGD for three consecutive months. At that time, the frequency of monitoring for these parameters shall be daily.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for cBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

19.a. Effluent Limitations/Monitoring Requirements:

Design flow is 24 MGD.

Effective Dates: During the period beginning with effective date of the permit and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
cBOD ₅ ^c	4	5 mg/L 400 kg/day	8 mg/L 700 kg/day	NA	NA	1/D ^c	24H-C
Total Suspended Solids (TSS) ^c	4	6.0 mg/L 540 kg/day	9.0 mg/L 820 kg/day	NA	NA	1/D ^c	24H-C
Dissolved Oxygen	3,5	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3	NL mg/L	NA	NA	NA	3D/W	24H-C
Ammonia, as N (Nov-Jan)	3,5	NL mg/L	NL mg/L	NA	NA	1/D	24H-C
Ammonia, as N (Feb-Mar)	3,5	4.3 mg/L	5.2 mg/L	NA	NA	1/D	24H-C
Ammonia, as N (Apr-Oct)	3,4,5	1.0 mg/L 91 kg/day	4.1 mg/L 370 kg/day	NA	NA	1/D	24H-C
<i>E. coli</i> (Geometric Mean) ^{c,d}	3	126 n/100mls	NA	NA	NA	1/D ^c	Grab
Nitrate+Nitrite, as N	3, 6	NL mg/L	NA	NA	NA	3D/W	24H-C
Total Nitrogen ^a	3, 6	NL mg/L	NA	NA	NA	3D/W	Calculated
Total Nitrogen – Year to Date ^b	3, 6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen - Calendar Year ^b	3, 6	3.0 mg/L	NA	NA	NA	1/YR	Calculated
Total Phosphorus	4	0.18 mg/L 36 lb/day	0.27 mg/L 54 lb/day	NA	NA	1/D	24H-C
Chronic Toxicity – <i>C. dubia</i> (TU _c)		NA	NA	NA	NL	1/YR	24H-C
Chronic Toxicity – <i>P. promelas</i> (TU _c)		NA	NA	NA	NL	1/YR	24H-C

The basis for the limitations codes are:

MGD = Million gallons per day.

1/D = Once every day.

1. Federal Effluent Requirements

NA = Not applicable.

1/M = Once every month.

2. Best Professional Judgment

NL = No limit; monitor and report.

3D/W = Three days a week.

3. Water Quality Standards

S.U. = Standard units.

1/YR = Once every calendar year.

4. Potomac Embayment Standards

TIRE = Totalizing, indicating and recording equipment.

5. Stream Model- Attachment 13

6. 9VAC25-40 (Nutrient Regulation)

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by $\geq 10\%$ or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

b. See Section 20.a. for the calculation of the Nutrient Calculations.

c. See Section 21.n. The facility shall monitor at reduced frequencies (3D/W – Three days a week for cBOD and TSS, and 5D/W – Five days a week for *E. coli*) until the monthly average flow reaches 16 MGD for three (3) consecutive months at the 24 MGD flow tier, then the permittee shall begin daily (1/D) monitoring for cBOD₅, TSS, and *E. coli*.

d. Samples shall be collected between 10:00 a.m. and 4:00 p.m.

19.b. Effluent Limitations/Monitoring Requirements:

Stormwater Outfalls 001-007

Effective Dates: During the period beginning with effective date of the permit and lasting until the expiration date.

The facility is authorized to discharge non-contaminated stormwater through Stormwater Outfalls 001-007.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge of process wastewater through these outfalls.

20. Other Permit Requirements:

a. Part I.B. of the permit contains quantification levels and compliance reporting instructions.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

b. Permit Section Part I.C., details the requirements of a Pretreatment Program

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.D requires all discharges to protect water quality. The VPDES Permit Regulation at 9VAC25-31-730 through 900., and the Federal Pretreatment Regulation at 40 CFR Part 403 requires POTWs with a design flow of >5.0 MGD and receiving from Industrial Users (IUs) pollutants which pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards to develop a pretreatment program.

This treatment works is a POTW with a design capacity of 24 MGD. Prince William County Service Authority has been working with DEQ Pretreatment Staff to implement an approved pretreatment program. The pretreatment program conditions in the proposed permit reissuance shall include: implementation of the approved pretreatment program that complies with the Clean Water Act, State Water Control Law, state regulations, and the approved program.

c. Permit Section Part I.D., details the requirements for Whole Effluent Toxicity (WET) Program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A WET Program is imposed for municipal facilities with a design rate >1.0 MGD, with an approved pretreatment program or required to develop a pretreatment program, or those determined by the Board based on effluent variability, compliance history, IWC, and receiving stream characteristics. This section of the permit sets forth the requirements for monitoring for Whole Effluent Toxicity.

The statistical evaluation in Attachment 14 demonstrate that there is no limit necessary for Whole Effluent Toxicity.

Attachment 15 contains a summary of the past testing results for this facility.

d. Permit Section Part III. details requirements of the Sewage Sludge (Biosolids) Management Plan, Sludge Monitoring and Additional Reporting Requirements.

With this reissuance, the permittee requested that the special conditions for land application through a contractor be included in the permit. These conditions are applicable only when the biosolids are land applied.

1. Regulations:

The VPDES Permit Regulation 9VAC25-31-420 through 729 establishes the standards for the use or disposal of biosolids; specifically land application and surface disposal, promulgated under 40 CFR Part 503. Standards consist of general requirements, pollutant limits, management practices and operational standards. Furthermore, VPA Regulation 9VAC25-32-303 through 685 sets forth the requirements pertaining to Class A and Class B biosolids. Since the facility has the option of producing either Class A or Class B material, requirements for both were included with this reissuance. The permit sets forth the parameters to be monitored, monitoring frequencies, sampling types, the Biosolids Management Plan and reporting requirements.

Sewage sludge is the solid, semisolid, or liquid materials removed during the treatment of domestic sewage in a treatment facility. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum, domestic septage, portable toilet pumping. These regulations require that the sewage sludge undergo established treatment to meet the pathogen control levels, established treatment and management practices to meet the vector attraction reduction, and contain concentrations of regulated metals below established limits. The properly treated and processed sewage sludge becomes "biosolids" which can be safely recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth.

2. Evaluations:

Sludge Classification:

The HL Mooney WRF is considered as Class I sludge management facility. The permit regulation (9VAC25-31-500) defines a Class I sludge management facility as any POTW which is required to have an approved pretreatment program defined under Part VII of the VPDES Permit Regulation (9VAC25-31-730 to 900) and/or any treatment works treating domestic sewage sludge that has been classified as a Class I facility by the Board because of the potential for its sewage sludge use or disposal practice to adversely affect public health and the environment.

Sludge Pollutant Concentration:

The HL Mooney WRF conducted a pilot study utilizing the Schwing Bioset™ Lime Stabilization Technology to determine if the sewage sludge generated by the facility would be amenable to land application. As part of the pilot study, the facility conducted metals testing. The pollutant concentrations from sewage sludge analyses provided as part of the HL Mooney WRF application for the permit reissuance are presented Attachment 16. All sewage sludge applied to the land must meet the ceiling concentration for pollutants, listed in Table 7. Sewage sludge applied to the land must also meet either pollutant concentration limits, cumulative pollutant loading rate limits, or annual pollutant loading rate limits, also listed in Table 7.

Cumulative pollutant loading limits or annual pollutant loading limits may be applied to sewage sludge exceeding pollutant concentration limits but meeting the ceiling concentrations, depending upon the levels of treatment achieved and the form (bulk or bag) of sludge applied. It should be noted that ceiling concentration limits are instantaneous values and pollutant concentration limits are monthly average values. Calculations of cumulative pollutant loading should be based on the monthly average values and the annual whole sludge application rate.

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TABLE 7- SEWAGE SLUDGE POLLUTANT LIMITS

Pollutant	Ceiling Concentration Limits for All Sewage Sludge Applied to Land (mg/kg)*	Pollutant Concentration Limits for EQ and PC Sewage Sludge (mg/kg)*	Cumulative Pollutant Loading Rate Limits for CPLR Sewage Sludge (kg/hectare)	Annual Pollutant Rate Limits for APLR Sewage Sludge (kg/hectare/356 day period)**
Arsenic	75	41	41	2.0
Cadmium	85	39	39	1.9
Copper	4,300	1,500	1,500	75
Lead	840	300	300	15
Mercury	57	17	17	0.85
Molybdenum***	75	---	---	---
Nickel	420	420	420	21
Selenium	100	100	100	5.0
Zinc	7,500	2,800	2,800	140
Applies to:	All sewage sludge that is land applied	Bulk sewage sludge and bagged sewage sludge	Bulk sewage sludge	Bagged sewage
From VPDES Permit Reg. Part VI	Table 1, 9VAC25-31-540	Table 3, 9VAC25-31-540	Table 2, 9VAC25-31-540	Table 4, 9VAC25-31-540
From VPA 9VAC25-32	Table 1, 9VAC25-32-356	Table 2, 9VAC25-32-356	Table 3, 9VAC25-32-356	Table 4, 9VAC25-32-356

*Dry-weight basis

**Bagged sewage sludge is sold or given away in a bag or other container.

***Molybdenum is currently under study by the EPA.

Comparing data from the facility with Table 7 shows that metal concentrations are significantly below the ceiling and PC concentration requirements.

3. Options for Meeting Land Application:

There are four equally safe options for meeting land application requirements. The options include the Exceptional Quality (EQ) option, the Pollutant Concentration (PC) option, the Cumulative Pollutant Loading Rate (CPLR) option, and the Annual Pollutant Loading Rate (APLR) option.

Pollutant Concentration (PC) is the type of sludge that may only be applied in bulk and is subject to general requirements and management practices; however, tracking of pollutant loadings to the land is not required. The sludge from the HL Mooney WRF is considered Pollutant Concentration (PC) sewage sludge for the following reasons:

- The bulk sewage sludge from the HL Mooney WRF meets the PC limits in Table 1 of VPDES Permit Regulation Part VI, 9VAC25-31-540.
- The VPDES Permit Regulation, Part VI, Subpart D, (9VAC25-31-690 through 720) establishes the requirements for pathogen reduction in sewage sludge. The HL Mooney WRF can produce either Class A or Class B biosolids using the Bioset process. The facility can produce Class A biosolids under Alternative 6 for pathogen reduction. The facility can also produce Class B biosolids in accordance with the regulation (9VAC25-31-710.B.2. - Class B -Alternative 2. Alternative 2 defines Class B sludge as "Sewage sludge that is used or disposed that has been treated in a process that is equivalent to a Process to Significantly Reduce Pathogens (PSRP), as described in (9VAC25-31-710.D.). The HL Mooney WRF treats sludge using an anaerobic digestion process to reduce pathogens in accordance with the requirements of (9VAC25-31-710.D.3.).
- The VPDES Permit Regulation, Part VI, Subpart D, (9VAC25-31-690 through 720) also establishes the requirements for Vector Attraction Reduction in sewage sludge. Based on the information supplied with the VPDES Sludge Application, the HL Mooney WRF meets the requirements for Vector Attraction Reduction as defined by (9VAC25-31-720.B.1) whereby the Bioset process raises the pH of the sludge to 12 S.U. or higher by alkali addition and without the addition of more alkali, the pH remains at 12 S.U. or higher for 2 hours and then 11.5 S.U. or higher for an additional 22 hours.

4. Parameters to be Monitored:

In order to assure the sludge quality, the following parameters require monitoring: Arsenic, Cadmium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, and Zinc.

In order to ensure that proper nutrient management and pH management practices are employed, the following parameters are required: pH, Total Kjeldahl Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Total Phosphorus, Total Potassium, and Alkalinity (lime treated sludge should be analyzed for percent calcium carbonate equivalence). The nutrient and pH monitoring requirements apply only if the permittee land applies their own sludge. Since HL Mooney WRF will contract the land application responsibilities to an approved contractor, they are not required to monitor for nutrients, pH, Total Potassium and Alkalinity.

Soil monitoring in conjunction with soil productivity information is critical, especially for frequent applications, to making sound sludge application decisions from both an environmental and an agronomic standpoint. Since HL Mooney WRF will contract the land application responsibilities to an approved contractor, they are not required to perform soil monitoring.

5. Monitoring Frequency:

The monitoring frequency is based on the amount of sewage sludge applied in a given 365-day period. The permit application indicates that the total dry metric tons of sewage sludge generated at HL Mooney WRF are 5,722 dry metric tons per 365-day period. In the permit manual, the monitoring frequency for facilities that produce >1500 to ,15,000 metric tons per 365-day period is six times per year (once every 2 months). This reissuance proposes a monitoring frequency of once every two months when sewage sludge is land applied.

HL Mooney WRF is required to provide the results of all monitoring performed in accordance with Part III, and information on management practices and appropriate certifications no later than February 19th of each year (as required by the 503 regulations) to the Northern Regional Office of the Department of Environmental Quality. Each report must document the previous calendar year's activities.

6. Sampling:

Representative sampling is an important aspect of monitoring. Because the pollutant limits pertain to the quality of the final sewage sludge applied to the land, samples must be collected after the last treatment process prior to land application. Composite samples should be required for all samplings from this facility.

7. Biosolids Management Plan (BSMP):

The BSMP is required to be part of the VPDES permit application. The VPDES Sewage Sludge Permit Application Form and its attachments will constitute the applicant's BSMP. Any proposed sewage treatment works treating domestic sewage must submit a BSMP with the appropriate VPDES permit application forms at least 180 days prior to the date proposed for commencing operations. The permittee shall conduct all sewage sludge use or disposal activities in accordance with the SMP approved with the issuance of this permit. Any proposed changes in the sewage sludge use or disposal practices or procedures followed by the permittee shall be documented and submitted for Virginia Department of Environmental Quality review and approval no less than 90 days prior to the effective date of the changes.

Upon approval, the BSMP becomes an enforceable part of the permit. The permit may be modified or alternatively revoked and reissued to incorporate limitations/conditions necessitated by substantial changes in sewage sludge use or disposal practices.

HL Mooney WRF has submitted the VPDES Sewage Sludge Permit Application Form and its attachments. Their BSMP dated December 12, 2013 is on file at the Northern Regional Office of the Department of Environmental Quality.

8. Reporting Requirements:

The reporting requirements are for POTWs with a design flow rate equal to or greater than 1 MGD (majors), POTWs that serve a population of 10,000 or greater, and Class I sludge management facilities. A permit special condition, which requires these generators to submit an annual report on February 19th of each year, is included. The HL Mooney WRF shall use the Discharge Monitoring Report (DMR) forms as part of the annual report. A sample form (SP1 and S01 and SP2 and S02) with proper DMR parameter codes and its instructions are provided. In addition to the DMR forms, the

generators who land apply sewage sludge are responsible for submitting the additional information required by 9VAC25-31-590, i.e., appropriate certification statements, descriptions of how pathogen and vector attraction reduction requirements are met, descriptions of how the management practices (if applicable) are being met, and descriptions of how site restrictions (if applicable) are being met.

9. Records Keeping:

This special condition outlines record retention requirements for sludge meeting Class A or Class B pathogen reduction and vector attraction reduction alternative 1-10. Table 8 presents the record keeping requirements.

Table 8: Record Keeping for PC Sludge	
1	Pollutant concentrations of each pollutant in Part III.A.1. and Part III.A.2. of the permit;
2	Description of how the pathogen reduction requirement in Part III.A.1. and Part I.A.2. of the permit are met;
3	Description of how the vector attraction requirements in Part III.A.1. and Part I.A.2. of the permit are met;
4	Description of how the management practice specified in the approved Biosolids Management Plan and/or the permit are met;
5	Description of how the site restriction specified in the Sludge Management Plan and/or the permit are met;
6	Certification statement in Part III.B.3.f. of the permit.

21. Other Special Conditions:

- a. **95% Capacity Reopener.** The VPDES Permit Regulation at 9VAC25-31-200.B.4 requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.
- b. **Indirect Dischargers.** Required by VPDES Permit Regulation, 9VAC25-31-200 B.1 and B.2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.
- c. **O&M Manual Requirement.** Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. The permittee shall maintain a current Operations and Maintenance (O&M) Manual. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M Manual available to Department personnel for review upon request. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.
- d. **CTC, CTO Requirement.** The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.
- e. **Licensed Operator Requirement.** The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200 C, and by the Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class I operator.
- f. **Reliability Class.** The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of I.
- g. **Water Quality Criteria Reopener.** The VPDES Permit Regulation at 9VAC25-31-220 D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.
- h. **Biosolids/Sludge Reopener.** The VPDES Permit Regulation at 9VAC25-31-220.C requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works. This special condition shall be included in Part III of the permit.

- i. **Sludge Use and Disposal.** The VPDES Permit Regulation at 9VAC25-31-100.P; 220.B.2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage. This special condition shall be included in Part III of the permit.
- j. **E3/E4.** 9VAC25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.
- k. **Nutrient Reopener.** 9VAC25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.
- l. **TMDL Reopener.** This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.
- m. **PCB Pollutant Minimization Plan.** This special condition requires the permittee, upon notification from DEQ-NRO, to submit a Pollutant Minimization Plan (PMP) to identify known and unknown sources of low-level PCBs in the effluent. This special condition details the contents of the PMP and also requires an annual report on progress to identify sources.
- n. **Final Effluent Monitoring Frequency.** The Sewage Collection and Treatment Regulations require that a facility with a 24.0 MGD design flow collect conventional and Bacteria samples once a day. When the facility's monthly average flow reaches 16 MGD for 3 consecutive months at the 24.0 MGD flow tier, the facility shall begin daily monitoring for CBOD₅, TSS, and *E. coli*. This special condition shall not affect the monitoring frequency of any other parameters. If the facility has any exceedances of the numerical limitations associated with the parameters with the frequency reductions, upon written notification from DEQ, the facility shall increase the frequency of the monitoring to daily for CBOD₅, TSS, and *E. coli* for the remaining term of the permit.
- o. **Application for Reclamation and Reuse and Reclaimed Water Management Plan.** In accordance with the current Water Reclamation and Reuse Regulation at 9VAC-25-740-10 *et seq*, the permittee shall submit to DEQ-NRO for review and approval, a detailed application and Reclaimed Water Management Plan at least 120 days prior to the expected commencement date for reuse. No reuse or reclamation shall occur until the facility is given administrative authorization from DEQ.

22. Permit Section Part II.

Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

- a. Special Conditions:
 - 1) The PCB monitoring special condition has been removed since the facility has completed the necessary sampling.
 - 2) A special condition for a PCB Pollutant Minimization Plan has been included.
 - 3) A special condition for the submittal of an Application for Reuse and Reclamation and a Reclaimed Water Management Plan has been included.
 - 4) Since the facility is considering the land application of Class A or Class B biosolids through a contractor, the necessary special conditions were included in the draft permit.
- b. Monitoring and Effluent Limitations:
 - 1) The 18 MGD flow tier and associated limits and monitoring were removed since the facility received the CTO for the 24 MGD flow tier.
 - 2) Since the facility is considering the land application of Class A or Class B biosolids through a contractor, the necessary monitoring and limitations were included in the draft permit.
 - 3) The requirement for acute whole effluent toxicity testing has been removed from the permit since the facility has exhibited no acute toxicity problems with the effluent. The chronic whole effluent toxicity testing remains in the draft permit.

4) The authority to discharge stormwater through Stormwater Outfalls 001-007 was included with this permit since the facility received a No Exposure Certification and the General Permit for Storm Water Discharges Associated with Industrial Activity was terminated.

24. Variances/Alternate Limits or Conditions:

With the last reissuance, the facility was granted monitoring frequency reductions at their 18 MGD flow tier for cBOD, TSS, and *E. coli* based on the compliance history of the facility. While the facility received the CTO for the 24 MGD tier in November 2010, the monthly average flow at the facility has been approximately 13 MGD from August 2012 through August 2013. Since the flows were still well under the design flow, DEQ granted the reduced monitoring frequencies for the 24 MGD flow tier until the monthly average flow reaches 16 MGD for three consecutive months. At that time, the frequency shall be daily.

25. Public Notice Information:

First Public Notice Date:

Second Public Notice Date:

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3834, Alison.Thompson@deq.virginia.gov. See Attachment 17 for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

26. Additional Comments:

Previous Board Action(s): None.

Staff Comments: Staff workload delayed the reissuance of this VPDES permit.

Public Comment: State "No comments were received during the public notice." or "Comments received during the public notice are provided in the attached Response to Comments." Include significant VDH, DGIF, DCR and EPA comments in the Response to Comments.

27. Development of the Policy for the Potomac River Embayments (9VAC25-415-10)

The information is carried forward with this reissuance so the history is maintained as part of the permit file.

The State Water Control Board adopted the Potomac Embayment Standards (PES) in 1971 to address serious nutrient enrichment problems evident in the Virginia embayments and Potomac River at the time. These standards applied to sewage treatment plants discharging into Potomac River embayments in Virginia and for expansions of existing plants discharging into the non-tidal tributaries of these embayments. The standards were actually effluent limitations for BOD, unoxidized nitrogen, total phosphorus, and total nitrogen:

Parameter	Effluent Limitations (monthly average)
BOD ₅	3 mg/L
Unoxidized Nitrogen	1 mg/L (April – October)
Total Phosphorus	0.2 mg/L
Total Nitrogen	8 mg/L (when technology is available)

Based upon these standards, several hundred million dollars were spent during the 1970s and 1980s upgrading major treatment plants in the City of Alexandria and the Counties of Arlington, Fairfax, Prince William, and Stafford. Today, these

localities operate advanced wastewater treatment plants, which have contributed a great deal to the dramatic improvement in the water quality of the upper Potomac estuary.

Before the planned upgrades at these facilities were completed, and the fact that water quality improved, questions arose over the high capital and operating costs that would result from meeting all of the requirements contained in the PES. Questions also arose due to the fact that the PES limits were blanket effluent limitations that applied equally to different bodies of water. Therefore, in 1978, the State Water Control Board committed to reevaluate the PES. In 1984, a major milestone was reached when the Virginia Institute of Marine Science (VIMS) completed state-of-the-art models for each of the embayments. The Board then selected the Northern Virginia Planning District Commission (NVPDC) to conduct wasteload allocation studies of the Virginia embayments using the VIMS models. In 1988, these studies were completed and effluent limits that would protect the embayments and the main stem of the Potomac River were developed for each major facility. The studies and all pertinent information are on file in the DEQ Northern Region Office.

Since the PES had not been amended or repealed, VPDES permits had included the PES standards as effluent limits. Since the plants could not meet all of the requirements of the PES, the plant owners operated under consent orders or consent decrees with operating effluent limits for the treatment plants that were agreed upon by the owners and the Board.

In 1991 and 1992, several Northern Virginia jurisdictions with embayment treatment plants submitted a petition to the Board requesting that the Board address the results of the VIMS/NVPDC studies. Their petition requested revised effluent limitations and a defined modeling process for determining effluent limitations.

The recommendations in the petition were designed to protect the extra sensitive nature of the embayments along with the Potomac River that have become a popular recreational resource during recent years. The petition included requirements more stringent than would be applied using the results of the modeling/allocation work conducted in the 1980s. With the inherent uncertainty of modeling, the petitioners question whether the results of modeling would provide sufficient protection for the embayments. By this petition, the local governments asked for continued special protection for the embayments based upon a management approach that uses stringent effluent limits. They believe this approach has proven successful over the past two decades. In addition the petition included a modeling process that will be used to determine if more stringent limits are needed in the future due to increased wastewater discharges.

The State Water Control Board adopted the petition, with revisions, as a regulation on September 12, 1996. The regulation is entitled *Policy for the Potomac River Embayments* (9VAC25-415-10). On the same date, the Board repealed the old PES. The new regulation became effective on April 3, 1997, and contains the following effluent limits:

Parameter	Effluent Limitations (monthly average)
CBOD ₅	5 mg/L
TSS	6 mg/L
Total Phosphorus	0.18 mg/L
Ammonia as Nitrogen	1.0 mg/L

9VAC25-415-50 Water Quality Monitoring. The Policy says "that water quality models may be required to predict the effects of wastewater discharges on the water quality of the receiving waterbody, the embayment, and the Potomac River. The purpose of the modeling shall be to determine if more stringent limits than those required by 9VAC25-415-40 (the Policy's effluent limitations) are required to meet water quality standards."